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09/603,147	06/23/2000	John T. Moore	MI22-1443	3541

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WELLS ST. JOHN ROBERTS GREGORY & MATKIN P.S.  
601 W. FIRST AVENUE  
SUITE 1300  
SPOKANE, WA 99201-3828

EXAMINER

KIELIN, ERIK J

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 12/16/2002

18

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.	Applicant(s)	
09/603,147	MOORE ET AL.	
Examiner	Art Unit	
Erik Kielin	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) Responsive to communication(s) filed on 28 June 2002, 2, and 20 October 2002.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) Claim(s) 68,70-77,79-81,83,84 and 87-94 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 68,70-77,79-81,83,84 and 87-94 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
     If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
  - a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                             | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>15,17</u> . | 6) <input type="checkbox"/> Other: _____.                                   |

**DETAILED ACTION*****Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 76, 77, 79-81, 83, and 84 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding independent claim 76, Applicant's specification does not have support for the terminology in the limitation describing the sidewall spacers as "being essentially free of nitrogen" as presently claimed. Rather the specification specifically points out that the sidewall spacers maybe silicon nitride (p. 20, lines 14-17), which clearly incorporates nitrogen. Consequently, the terminology chosen is not co-extensive in scope with the specification; rather, it is broader in scope.

If Applicant chooses to exclude nitrogen from the sidewall spacers, Applicant may use recognized close-ended language, such as "the sidewall spacers consist of silicon, oxygen, and carbon," a limitation for which there exists support from the specification (*ibid.*) which is co-extensive with the specification.

The remaining claims are rejected for depending form the independent claim 76.

***Claim Rejections - 35 USC § 103***

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3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 68, 74, 75 and 87-89, 92-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of US 5,935,873 (**Spuler et al.**).

**AAPA** clearly discloses each of the features of the DRAM including a semiconductor substrate 12, the three nodes 14, 16, 18 in gated electrical connection via wordlines 20, 22 with sidewalls 28, 30 (i.e. the wordlines are the conductive gates controlling the connection between the capacitors and the storage nodes); capacitor constructions 36, 38 formed in the openings of and directly against the insulating layer 34 and directly against the substrate 12; bit line contact 46; the etch stop 32 formed over, along, and proximate the wordlines and extending along and against a portion of the storage node (first electrode 40). Each capacitor construction comprises a storage node (first electrode) 40 formed of conductively doped polysilicon (specification, p. 4, lines 16-18), dielectric 42, and second electrode 44. (See Prior Art Figures 1-4 and specification, section entitled, "Background of Invention" -- especially pp. 5-8. Compare especially **AAPA** prior art Fig. 1 with non-prior art Fig. 7.)

**AAPA** does not state that the etch stop layer 32 contains carbon, i.e. is the "carbon-containing layer" which comprises "from about 2% to about 20% carbon." or more specifically silicon, carbon, and nitrogen, as further limited by instant claims 74, 75, 89, 92, and 93.

**Spuler** teaches the benefits of forming an etch stop layer 22 comprising carbon, specifically carbon-doped silicon nitride by using known deposition methods or by implantation of carbon into silicon nitride *to provide good etch selectivity* relative to an oxide layer 30, deposited thereover. (See col. 2, l. 39 to col. 3, l. 35.) The carbon content is 1% to 50% -- preferably 10% to 30%.

It would have been obvious to one of ordinary skill at the time of the invention to use the etch stop layer of **Spuler** in the **AAPA** production and device for the reasons in **Spuler** or, more specifically, that the carbon-doped silicon nitride in the etch stop layer provides better etch selectivity relative to oxides than silicon nitride alone, as is also, coincidentally, taught by the instant specification.

5. Claims 76, 77, and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of US 5,935,873 (**Spuler** et al.) and **Wolf**, et al. Silicon Processing for the VLSI Era, Vol. 2-Process Integration, Lattice Press: Sunset Beach CA, 1990, pp. 354-355.

Regarding claim 76, the prior art of **AAPA** in view of **Spuler**, as explained above, discloses each of the claimed features except for indicating that the sidewall spacers are "essentially free of nitrogen."

The basic textbook of **Wolf** teaches that typical sidewall spacers are formed from oxides which are, therefore, essentially free of nitrogen because oxides contain oxygen, not nitrogen (i.e. nitrides).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use a known material as taught by **Wolf** to form the sidewall spacers in **AAPA** because the selection of a known material (oxide) based upon its suitability for an intended purpose (sidewall spacers) is *prima facie* obvious in the absence of unexpected results. No unexpected results are presently of record.

Regarding claim 79, **Spuler** also teaches forming the etch stop **22** adjacent the gate (wordline) structure **12, 14, 16** (col. 2, ll. 8-24) which inherently serve as sidewall spacers. It would have been obvious to one of ordinary skill at the time of the invention to form the etch stop adjacent the wordlines in order to provide protection to the gate structure during etching, as this is desired in both **Spuler** and in the **AAPA**.

6. Claims **87, 88**, and **90-93** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of JP 10-223758 (**Nobuhisa**).

**AAPA**, as indicated above, teaches all of the features of the claims except for the indicating that the etch stop layer comprises silicon, oxygen, and carbon (claim 53) or silicon, oxygen, nitrogen, and carbon.

**Nobuhisa** teaches the benefits of forming an etch stop layer **20** comprising at least one of (1) silicon carbide (2) silicon, carbon, oxygen, and (3) silicon, carbon, oxygen, and nitrogen by implanting carbon and/or nitrogen into silicon dioxide layer **4b**. Note that although, **Nobuhisa** teaches that SiC or SiCN is formed, it is held absent evidence to the contrary that oxygen is necessarily present because the carbon and nitrogen are implanted into silicon dioxide. (See

paragraphs [0036]-[0039] and especially [0053] which states that both carbon and nitrogen are implanted; Figs. 4-6.)

It would have been obvious to one of ordinary skill at the time of the invention to form the etch stop of **AAPA** with the materials taught by **Nobuhisa** for the reasons in **Nobuhisa**, specifically to form an etch-resistant etch stop layer relative to silicon dioxide.

7. Claims 68 and 70-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of JP 10-223758 (**Nobuhisa**) and further in view of **Spuler**.

**AAPA** in view of **Nobuhisa**, as indicated above, teaches all of the features of the claims except for the indicating that the carbon content of the etch stop layer is from 2% to 20%.

**Spuler** teaches the appropriate amount of carbon in an etch resistant material for providing good selectivity relative to non-carbon containing dielectric materials is 1 to 50% or preferably 10% to 30%.

It would have been obvious to one of ordinary skill at the time of the invention was made to use the amount of carbon suggested in **Spuler** for the carbon resistant material taught in **Nobuhisa** for the etch stop in **AAPA**, for the reasons indicated in **Spuler**, for example, to give good etch selectivity and because **Nobuhisa** is not limited to any amount of carbon content except for that amount that gives the desired etch selectivity that **Nobuhisa** teaches which is the subject of the patent.

Further in this regard, although the carbon quantity is not exactly as claimed by Applicant, overlapping ranges are *prima facie* obvious in the absence of unexpected results. (See

MPEP 2144.05.) The choice is obvious to optimize the amount of carbon to provide the best etch selectivity relative to a non-carbon-containing dielectric, according to the teachings of **Nobuhisa** and **Spuler**.

8. Claims 76, 77, 81, 83, 84, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of JP 10-223758 (**Nobuhisa**) and **Spuler**, and further in view of **Wolf**.

Regarding claim 76, the prior art of **AAPA** in view of **Nobuhisa** and **Spuler**, as explained above, discloses each of the claimed features except for indicating that the sidewall spacers are "essentially free of nitrogen."

The basic textbook of **Wolf** teaches that typical sidewall spacers are formed from oxides which are, therefore, essentially free of nitrogen because oxides contain oxygen, not nitrogen (i.e. nitrides).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use a known material as taught by **Wolf** to form the sidewall spacers in **AAPA** because the selection of a known material (oxide) based upon its suitability for an intended purpose (sidewall spacers) is *prima facie* obvious in the absence of unexpected results. No unexpected results are presently of record.

9. Claims 87, 88, and 90-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (**AAPA**) in view of US 6,136,700 (**McAnally et al.**).

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The **AAPA** discloses all of the features of the instant invention, as noted above, except for indicating that the etch stop layer or sidewalls comprise (1) a material having carbon, (2) silicon carbide, (3) a material having carbon, silicon, and oxygen, (4) a material having carbon, silicon, and nitrogen.

**McAnally** teaches forming either or both the sidewall spacers **108** and etch stop **110** from the aforementioned compositions containing carbon to improve etch selectivity -- several of which are *free of nitrogen*. (Abstract; col. 3, lines 37-40; claim 3; col. 5, lines 10-43; col. 6, lines 25-31).

It would have been obvious to one of ordinary skill at the time of the invention was made to use the etch stop of **McAnally** for the etch stop of **AAPA** for the reasons indicated therein in **McAnally** as just noted.

10. Claims **68**, 70-75, and **76**, 77, 79-81, 83, 84, and 89, 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over **AAPA** in view of **McAnally** and further in view of **Spuler**.

The **AAPA** in view of **McAnally** discloses all of the features of the instant invention, as noted above, except for indicating the specified amount of 2% to 20% carbon by weight is not taught.

**Spuler** teaches the appropriate amount of carbon in an etch resistant material for providing good selectivity relative to non-carbon containing dielectric materials is 1 to 50% or preferably 10% to 30%.

It would have been obvious to one of ordinary skill at the time of the invention was made to use the amount of carbon suggested in **Spuler** for the carbon resistant material taught in **McAnally** for the reasons indicated in **Spuler** and because **McAnally** is not limited to any amount of carbon except for that amount that gives the desired etch selectivity that **McAnally** teaches is the object of his invention.

Further in this regard, although the carbon quantity is not exactly as claimed by Applicant, overlapping ranges are *prima facie* obvious in the absence of unexpected results. (See MPEP 2144.05.) The choice of carbon content is obvious to optimize the amount of carbon to provided the best etch selectivity relative to a non-carbon-containing dielectric, according to the teachings of **McAnally** and **Spuler**.

Then regarding claim 94, while **McAnally** specifically provides sidewalls spacers which are “free of nitrogen,” the thickness of the sidewall spacer in **AAPA** is not taught to be less than or equal to 500 angstroms and is not mentioned in **McAnally**. However, **McAnally** further indicates that a success of the invention is that “the invention allows for maximizing the area on the substrate that is in contact with a self-aligned contact” and that “the large contact area reduces the contact resistance and therefore increases the performance of the semiconductor device.” (See col. 2, lines 18-27.) And more pertinently, **McAnally** states, “Thus the use of an appropriate material for stopping layer **110** may allow the use of thinner films for the insulating film **106** and *the sidewall [spacers]* **108**, which increases contact area and improves planarity.” (See col. 4, lines 42-45; Italicized emphasis added.) **McAnally** explicitly suggests minimizing the width of the sidewall spacers **108** which directly affect the contact area. The greater etch selective materials enable narrower or thinner sidewall spacers and etch stops because, as

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indicated in **McAnally**, the etch selectivity is greater between the carbon-containing materials and the non-carbon-containing materials. Accordingly, it would have been obvious for one of ordinary skill in the art, at the time of the invention to choose a sidewall spacer width of less than 500 Å in order to increase the contact area in accord with the **McAnally** invention and to thereby provide greater contact area in the **AAPA** contact. (Compare this with the instant specification paragraphs bridging pages 14-15 and 22-23, which conveys virtually the same concept as **McAnally**.)

Furthermore, the selection of the sidewall spacer thickness is *prima facie* obvious because it is a matter of determining optimum process condition by routine experimentation with a single variable, i.e. the thickness of the sidewall spacers within the implicit suggestion of **McAnally** which indicates that carbon-containing sidewall spacers and etch stops are more etch selective, which implicitly indicates that said materials can perform the same etch-prevention function with less of the material. (See MPEP 2144.05.)

Furthermore, as devices shrink, so do the dimensions of the features of each device according to Moore's Law. Accordingly, the choice of sidewall spacer thickness is merely a matter of routine optimization, as indicated above. Applicant has not recognized an advantage not already known in the art regarding the thickness of the spacers. In other words, one of ordinary skill would not continue to use sidewall spacers of a thickness used in a 1- $\mu\text{m}$  rule, for devices in a 0.18- $\mu\text{m}$  rule; instead, the size of all of the features, particularly the sidewall spacers, would be necessarily be scaled down.

Further regarding the width of the sidewall spacers, **Spuler** col. 2, lines 40-48, discloses the dimension of the opening, which is as small as 500 Å (0.05  $\mu\text{m}$ ) wide. It is clear then that the

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**Spuler** sidewall spacer portion of the etch stop layer are less than 500 Å; otherwise they would close off the contact. More specifically, the sidewall spacer portion of the etch stop layer is indicated to be 200 Å to 300 Å.

It would have been obvious to one of ordinary skill at the time of the invention to choose the sidewall spacer thickness in the **AAPA** to be less than 500 Å, depending upon the size of the opening between the wordlines, in order to optimize the sidewalls relative to the device being formed, and for the reasons just indicated above.

#### ***Double Patenting***

11. Applicant is advised that should claim 70 be found allowable, claims 72 and 73 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. Applicant is advised that should claims 74 and 75 be found allowable, claims 83 and 84 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof, respectively. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

#### ***Response to Arguments***

In the Response filed on 2 October 2002, Paper No. 16, at p. 8, second paragraph, Applicant argues that the specification has support for the limitation that the spacers be “essentially free of nitrogen” because p. 17, lines 16-17 of the instant specification indicates that a material can consist essentially of silicon, oxygen, and carbon.” Examiner notes with interest

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that spacers are not being discussed at this location of the specification. Rather this material is indicated for the “etch stop layer” -- not the spacers. Accordingly, Applicant’s argument appears to support the position taken by the Examiner since the instant specification is taking only about the etch stop consisting essentially of silicon, oxygen, and carbon. Moreover, The very next sentence in the instant specification states that said etch stop layer will be referred to as “silicon nitride,” which clearly does not suggest the Applicant had possession of even an etch stop layer which is “essentially free of nitrogen” --much less a spacer which is “essentially free of nitrogen.” And as noted above in the rejection, Applicant indicates that the spacers may be silicon nitride which does not support the newly added negative limitation of its absence.

While not commenting on Applicant’s suggestion that the MPEP indicates that verbatim support for the claim terminology is not required, the instant specification location used by Applicant to make the argument is that the etch stop layer --not the spacers-- consists essentially of silicon, oxygen and carbon. “Consisting essentially of” also suggests that something else may be present in the etch stop layer. Since the etch stop layer and spacers may be silicon nitride, there is express suggestion that nitrogen may be in the etch stop and the spacers. Accordingly, the new limitation that the spacers are “essentially free of nitrogen” is not supported by the specification since nitrogen may be present. Also accordingly, Applicant has not met the written description requirement for the claimed limitation that suggests that Applicant contemplated a spacer “essentially free of nitrogen.” See *New Railhead Manufacturing LLC v. Vermeer Manufacturing Co.*, 63 USPQ2d 1843 (CA FC 2002.) (“Patent for drill bit for horizontal drilling in rock is not entitled to priority date of provisional application, since specification of provisional application must satisfy written description requirement of 35 U.S.C. §112 for invention claimed

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in non-provisional application, and since provisional application does not adequately describe, to one of ordinary skill in art, claim limitation at issue, namely, specific angled relationship between drill bit and its housing.” “Written description requirement of 35 U.S.C. §112 is measured from face of application, and is not satisfied if one of ordinary skill in art must first construct invention in order to ascertain its claimed features; *assertions that inventor was at all times in possession of claimed invention are misdirected if specification fails to convey fact of such possession to one of ordinary skill.*” Emphasis added.)

Applicant argues that the combination of AAPA with one or more of Spuler, McAnally, Wolf, and Nobuhisa fails to teach each and every limitation. Examiner respectfully disagrees. The first limitation suggested by Applicant to be absent appears to be the electrode material being doped polysilicon. The AAPA teaches doped polysilicon storage node 40 (an electrode) and electrode 44 in reference to the prior art Figs., at p. 4, last paragraph of the instant specification. Accordingly, Applicant’s argument appears to be in error for not considering the AAPA fully. For this reason, none of Spuler, McAnally, Wolf, and Nobuhisa is required to indicate that doped polysilicon is deposited in the contact opening. Moreover, in as much as the carbon-containing silicon oxide etch stop or spacers are for etching purposes --prior to the deposition of the contact material-- it is unclear as to why the material from which it was made is relevant. Inasmuch as the “conductively doped polysilicon” is AAPA, the point would appear to be moot.

The second limitation suggested by Applicant to be absent is that at least a portion of the electrode extends along and against a material comprising from about 2% to about 20% carbon. Examiner respectfully disagrees. Since the electrodes of AAPA and of Spuler and

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McAnally each are deposited against the etch stop material, this limitation is properly suggested by the combination of references. AAPA Fig. 1 shows the etch stop 32 and spacers 28 against the electrode 46. The Spuler contact opening is lined with a carbon-containing layer which has 1% to 50% carbon. The electrode necessarily is against this. McAnally shows the electrode 120 against carbon-containing spacers 108. Accordingly, it is unclear as to how Applicant can suggest that this feature is not taught, as it is each of the three references mentioned.

The third limitation that Applicant appears to argue is absent is the limitation "essentially free of nitrogen." While Applicant does not have support for this limitation, McAnally teaches numerous etch stops which are nitrogen free, as noted above in the rejections and as noted in the equivalent rejections in the action filed 3 July 2002.

The fourth limitation that Applicant appear to argue is absent from the applied art is that the carbon-containing material is dierectly against the conductive gates. The cover Figure of Spuler shows this to be in error. The carbon-containing material 22a completely lines above and to the sides, the gate stack 12, 14, 16. McAnally teaches a variety of carbon-containing materials 108 along the conductive gates 104. Accordingly the argument appears to be in direct contradiction to that shown in Spuler and McAnally.

Applicant repeats the argument that the indication of the claims above as duplicates is improper. Examiner respectfully disagrees. First the preambles do not distinguish the claimed limitations, accordingly they are **substantial** duplicates. Second, there exists nothing in the specification to suggest how "comprising" and "consisting essentially of" further distinguish the claimed limitation. Third, the claims read on each other based on the limitations which is the test for double patenting. Accordingly, the rejection is still considered to be proper.

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*Conclusion*

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication from examiner should be directed to Erik Kielin whose telephone number is (703) 306-5980 and e-mail address is [erik.kielin@uspto.gov](mailto:erik.kielin@uspto.gov). The examiner can normally be reached by telephone on Monday through Thursday 9:00 AM until 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at (703) 308-4940 or by e-mail at [carl.whitehead@uspto.gov](mailto:carl.whitehead@uspto.gov). The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.



CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

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December 6, 2002